

We claim:

1. An isolated polypeptide or variant thereof comprising a polypeptide sequence having substantial identity to a wild type ricin A chain first globular domain sequence and lacks detectable N-glycosidase-rRNA activity or exhibits reduced N-glycosidase-rRNA activity as compared to a control.
2. The polypeptide of claim 1, wherein the polypeptide retains the functional integrity of the neutralizing immunological epitope of wild type ricin A chain.
3. The polypeptide of claim 1, wherein the polypeptide has an aqueous solubility that is greater than the solubility of wild type ricin A chain.
4. The polypeptide of claim 1, wherein the wild type ricin A chain first globular domain sequence is SEQ ID NO:2 or a variant thereof.
5. The polypeptide of claim 1, wherein the polypeptide sequence comprises SEQ ID NO:3, SEQ ID NO:4, or a variant thereof.
6. The polypeptide of claim 1, wherein the polypeptide sequence is substantially identical to SEQ ID NO:3 or SEQ ID NO:4.
7. The polypeptide of claim 1, wherein the polypeptide sequence lacks a hydrophobic loop that corresponds to the hydrophobic loop of wild type ricin A chain.
8. The polypeptide of claim 1, wherein the polypeptide sequence comprises at least one amino acid mutation, substitution, deletion, or a combination thereof, when compared to an amino acid sequence of ricin.
9. The polypeptide of claim 1, made by recombinant DNA techniques.
10. The polypeptide of claim 1, made by proteolytically cleaving the first globular domain and the second globular domain of ricin A chain and then purifying the first globular domain.
11. An isolated polynucleotide that encodes the polypeptide or variant of claim 1.
12. An antibody raised against the polypeptide or variant of claim 1.
13. The antibody of claim 12, wherein the antibody is a neutralizing antibody that is capable of neutralizing ricin, ricin A chain, or both.

14. A pharmaceutical composition comprising at least one polypeptide or variant of claim 1 in an immunogenic amount and a pharmaceutically acceptable vehicle.

15. The pharmaceutical composition of claim 14, and further comprising an adjuvant.

16. The pharmaceutical composition of claim 14, wherein the composition is capable of eliciting an immune response when administered to a subject.

17. The pharmaceutical composition of claim 16, wherein the immune response is a protective immune response.

18. A pharmaceutical composition comprising at least one antibody of claim 12 in a therapeutically effective amount and a pharmaceutically acceptable vehicle.

19. A vaccine comprising an immunogenic amount of at least one polypeptide or variant of claim 1.

20. A method of inducing an immune response in a subject which comprises administering to the subject at least one immunogenic amount of the polypeptide or variant of claim 1.

21. The method of claim 20, which further comprises administering to the subject at least one booster dose.

22. A method of providing passive immunity against ricin intoxication in a subject comprising administering to the subject a therapeutically effective amount of at least one antibody of claim 12.

23. A method of treating or preventing ricin intoxication in a subject comprising administering to the subject an immunogenic amount of the polypeptide or variant of claim 1, or administering to the subject a therapeutically effective amount of an antibody raised against the polypeptide or variant of claim 1.

24. A kit comprising at least one of the following

- (a) an isolated polypeptide or variant thereof comprising a polypeptide sequence having substantial identity to a wild type ricin A chain first globular domain sequence and lacks detectable N-glycosidase-rRNA activity or exhibits reduced N-glycosidase-rRNA activity as compared to a control;
- (b) an antibody raised against the isolated polypeptide or variant of (a);

(c) a pharmaceutical composition comprising at least one polypeptide or variant of (a) in an immunogenic amount and a pharmaceutically acceptable vehicle; and

(d) a vaccine comprising an immunogenic amount of at least one polypeptide or variant of (a);

packaged together with instructions for use.

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